JC07 Rec'd PCT/PTO 26 APR 2001

FORM-PTO-1390 (Rev. 12-29-99) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER: 027566-027

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

U S APPLICATION NO (If known, see 37 C.F.R. 1.5): UNASSIGNED 09/830430

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/EP99/08067	26 October 1999	27 October 1998

TITLE OF INVENTION
DETERMINATION OF THE PROPAGATION DELAY IN A PACKET SWITCHED NETWORK

APPLICANT(S) FOR DO/EO/US
Leslie GRAF, Christian GROVES and Ian RYTINA

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and the PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☒ has been transmitted by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US)
6. ☐ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
   a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☐ have been transmitted by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☒ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern other document(s) or information included:

11. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☐ A FIRST preliminary amendment.
    ☐ A SECOND or SUBSEQUENT preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☒ Other items or information:

    International Preliminary Examination Report, PCT Demand, Unexecuted Declaration

531 Rec'd PCT 26 APR 2001

U.S. APPLICATION NO. (If known, see 37 C.F.R. 1.5)	INTERNATIONAL APPLICATION NO	ATTORNEY'S DOCKET NUMBER
UNASSIGNED 09/830430	PCT/EP99/08067	027566-027

17. ☒ The following fees are submitted:	CALCULATIONS	PTO USE ONLY
Basic National Fee (37 CFR 1.492(a)(1)-(5)):		
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO $1,000.00 (960)		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO $860.00 (970)		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO $710.00 (958)		
International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4) $690.00 (956)		
International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4) $100.00 (962)		
ENTER APPROPRIATE BASIC FEE AMOUNT =	$ 860.00	
Surcharge of **$130.00 (154)** for furnishing the oath or declaration later than 20 ☐ 30 ☐ months from the earliest claimed priority date (37 CFR 1.492(e)).	$ -0-	

Claims	Number Filed	Number Extra	Rate		
Total Claims	4 -20 =	-0-	X$18.00 (966)	$ -0-	
Independent Claims	2 -3 =	-0-	X$80.00 (964)	$ -0-	
Multiple dependent claim(s) (if applicable)			+$270.00 (968)	$ -0-	
TOTAL OF ABOVE CALCULATIONS =				$	
Reduction for 1/2 for filing by small entity, if applicable (see below).				$ -0-	-
SUBTOTAL =				$ 860.00	
Processing fee of **$130.00 (156)** for furnishing the English translation later than 20 ☐ 30 ☐ months from the earliest claimed priority date (37 CFR 1.492(f)). +				$ -0-	
TOTAL NATIONAL FEE =				$ 860.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). **$40.00 (581)** per property +				$ -0-	
TOTAL FEES ENCLOSED =				$ 860.00	
				Amount to be: refunded	$
				charged	$

a. ☐ Small entity status is hereby claimed.

b. ☒ A check in the amount of $ 860.00 to cover the above fees is enclosed.

c. ☐ Please charge my Deposit Account No. 02-4800 in the amount of $_____ to cover the above fees. A duplicate copy of this sheet is enclosed.

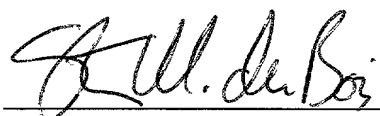
d. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 02-4800. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

Ronald L. Grudziecki, Esq.
BURNS, DOANE, SWECKER & MATHIS, L.L.P.
P.O. Box 1404
Alexandria, Virginia 22313-1404
(703) 836-6620

Date: April 26, 2001



SIGNATURE

Steven M. duBois

NAME

35,023

REGISTRATION NUMBER

JC11 Rec'd PCT/PTO SEP 2 0 2001

FORM-PTO-1390 (Rev. 12-29-99) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER: 027566-027

U.S. APPLICATION NO (If known, see 37 C F R 1.5): 09/830,430

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/EP99/08067	26 October 1999	27 October 1998

TITLE OF INVENTION: DETERMINATION OF THE PROPAGATION DELAY IN A PACKET-SWITCHED NETWORK

APPLICANT(S) FOR DO/EO/US: Leslie GRAF, Christian GROVES and Ian RYTINA

JC132 SEP 20 2001 PATENT & TRADEMARK OFFICE

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☐ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☒ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This is an express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and the PCT Articles 22 and 39(1).
4. ☐ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☐ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
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7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
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   b. ☐ have been transmitted by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
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11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
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13. ☐ A FIRST preliminary amendment.
    ☐ A SECOND or SUBSEQUENT preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☐ Other items or information: Petition for 2 Month Extension of Time

U.S. APPLICATION NO. (If known,/ see 37 C.F.R. 1.50)	INTERNATIONAL APPLICATION NO	ATTORNEY'S DOCKET NUMBER
09/830,430	PCT/EP99/08067	027566-027

17. ☒ The following fees are submitted:	CALCULATIONS	PTO USE ONLY
Basic National Fee (37 CFR 1.492(a)(1)-(5)):		
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International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4) $100.00 (962)		
ENTER APPROPRIATE BASIC FEE AMOUNT =	$	
Surcharge of **$130.00 (154)** for furnishing the oath or declaration later than 20 ☐ 30 ☒ months from the earliest claimed priority date (37 CFR 1.492(e)).	$ 130.00	

Claims	Number Filed	Number Extra	Rate		
Total Claims	-20 =		X$18.00 (966)	$	
Independent Claims	-3 =		X$80.00 (964)	$	
Multiple dependent claim(s) (if applicable)			+$270.00 (968)	$	
			TOTAL OF ABOVE CALCULATIONS =	$	
Reduction for 1/2 for filing by small entity, if applicable (see below).				$	-
			SUBTOTAL =	$ 130.00	
Processing fee of **$130.00 (156)** for furnishing the English translation later than 20 ☐ 30 ☐ months from the earliest claimed priority date (37 CFR 1.492(f)). +				$	
			TOTAL NATIONAL FEE =	$	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). **$40.00 (581)** per property +				$	
			TOTAL FEES ENCLOSED =	$ 130.00	
				Amount to be: refunded	$
				charged	$

09/24/2001 MKAYPAGH 00000141 09830430
01 FC:154 130.00 OP

a. ☐ Small entity status is hereby claimed.

b. ☒ A check in the amount of $ 130.00 and $390.00 to cover the above fees is enclosed.

c. ☐ Please charge my Deposit Account No. 02-4800 in the amount of $_____ to cover the above fees. A duplicate copy of this sheet is enclosed.

d. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 02-4800. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

Ronald L. Grudziecki
BURNS, DOANE, SWECKER & MATHIS, L.L.P.
P.O. Box 1404
Alexandria, Virginia 22313-1404
(703) 836-6620

Date: September 20, 2001

SIGNATURE

Kenneth B. Leffler
NAME

36,075
REGISTRATION NUMBER

DETERMINATION OF THE PROPAGATION DELAY IN A PACKET SWITCHED NETWORK

Field of the Invention

The present invention relates to packet switched networks and more particularly to the transmission of real time voice and data information over a packet switched network.

Background to the Invention

Conventional telecommunications networks for conveying voice and other user information have in general relied upon dedicated telecommunications network infrastructure and transmission protocols. However, with the recent explosive growth in digital data transmission, driven in particular by the use of intranets and the Internet, there has been a move towards the use of more generic infrastructure and transmission protocols in the telecommunications industry. This move is driven primarily by the desire for interoperability between telecommunications networks and other data networks, and secondarily by the cost and performance advantages which general data network systems offer over conventional telecommunications systems.

There exist proposals for the replacement of certain parts of telecommunications networks with packet switched networks and in particular with Internet Protocol (IP) networks. For example, telephone exchanges may be interconnected via IP networks for the purpose of carrying both signalling and user voice and data information.

Subscriber telephone terminals in a Public Switched Telephone Network (PSTN) are generally connected to

respective local exchanges via two-wire connections which provide for duplex (i.e. bidirectional) communication. A so-called "hybrid" located at the local exchange converts the bidirectional voice signals from the two-wire lines into unidirectional signals for transmission over four-wire lines used in the inter-exchange trunk connections. Imperfections in the hybrids may allow leakage of signals back to a speaker's telephone from where the signals originated, giving rise to the perception of an echo.

In conventional networks, the problem of echo is reduced by including an echo cancellation device in a telephone circuit if the propagation delay over the circuit exceeds some predefined period (e.g. 15msec). As the route taken by a telephone circuit is not always predefined, the first exchange in the circuit identifies the "statically" defined delay for next leg and forwards this to the exchange at the end of that leg. The receiving exchange then appends the delay for the next leg to the already accumulated delay and forwards this to the next exchange and so on. When the accumulated delay exceeds the predefined period, a backward message is sent to the originating exchange asking for an incoming or outgoing echo cancellation device to be included in the circuit.

The above process works because in conventional telephone circuits, which use circuit switched traffic channels, the propagation delay over a circuit leg can be predicted with great accuracy. The proposal to transmit telephone voice data between exchanges using a packet switched network upsets this situation as by its very nature packet switched circuits are unpredictable. Unpredictability arises both because a packet may be transmitted between two end points by one of several

different routes and because the network uses only a "best effort" to transmit a packet, i.e. if the network is busy a packet may have to wait or may indeed be lost. The propagation delay over a circuit link provided by a packet switched network cannot therefore be statically defined.

Summary of the Present Invention

It is an object of the present invention to overcome or at least mitigate the above noted disadvantages of using packet switched networks in telecommunication networks. It is a further object of the present invention to provide a telecommunication network in which the propagation delay for voice data sent over a packet switched network can be dynamically determined for the purposes of echo cancellation.

According to a first aspect of the present invention there is provided a method of determining the propagation delay over a packet switched network intended to provide a segment of a telephone circuit for carrying information between at least two subscriber terminals, the method comprising:

reacting to a request for a telephone circuit between said two subscribers by transmitting a packet containing an echo request message over the packet switched network from a first network node to a second network node;

reacting to receipt of the echo request message at the second network node by transmitting a packet containing an echo reply message over the packet switched network from the second network node to the first network node; and

and determining the round trip propagation delay for the packet switched network segment on the basis of

the time which elapses between sending the echo request message from the first node and receiving the echo reply message also at the first node.

Preferably, the propagation delay for the packet switched network segment is determined prior to the sending of an Initial Address Message (IAM) over the packet switched network segment. More preferably, the determined round trip delay is appended or added to delays determined for preceding circuit segments defined in the IAM, for transmission over the packet switched network.

Preferably, the method described above is employed with an IP network.

According to a second aspect of the present invention there is provided apparatus for determining the propagation delay over a packet switched network intended to provide a segment of a telephone circuit for carrying information between at least two subscriber terminals, the apparatus comprising:

a first packet switched network node coupled between a first subscriber and the packet switched network and arranged to react to a request for a telephone circuit between said two subscribers by transmitting a packet containing an echo request message over the packet switched network to a second packet switched network node;

the second node being arranged to react to receipt of the echo request message by transmitting a packet containing an echo reply message over the packet switched network to the first network node; and

processing means associated with the first network node arranged to determine the round trip propagation delay for the packet switched network segment on the basis of the time which elapses between sending the echo

request message from the first node and receiving the echo reply message also at the first node.

Brief Description of the Drawings

For a better understanding of the present invention and in order to show how the same may be carried into effect reference will now be made, by way of example, to the accompanying drawings, in which:

Figure 1 shows schematically a telecommunications system incorporating an IP network; and

Figure 2 is a flow diagram showing a part of a call set-up phase in the system of Figure 1.

Detailed Description of Certain Embodiments

There is illustrated in Figure 1 a telephone system in which a pair of subscriber telephone terminals 1,2 are connected to respective local access exchanges 3,4 via PSTN access networks. The access exchanges 3,4 are in turn connected to respective IP gateway nodes 5,6 via an ISUP (ISDN User Part) interface. Interconnection between the gateway nodes 5,6 is provided via an IP network 7 which may be the Internet or, as is more likely, a closed network employing the TCP/IP protocol.

It will be appreciated that the example shown in Figure 1 is greatly simplified and the system may include one or more transit exchanges connecting the local access exchanges 3,4 to the IP gateway nodes 5,6. Moreover, the connection between the subscriber terminals 1,2 and the access exchanges 3,4 may be made via one or more intermediate "routers". It will also be appreciated that the IP network 7 comprises a number of interconnected routers such that the path taken by a

packet between the two gateway nodes 5,6 may vary under different circumstances.

Full details of a typical call set-up procedure in a PSTN will not be given here. Rather, the reader is referred to for example to "Understanding Telecommunications", Studentlitteratur, Sweden (ISBN 91-44-00214-9). For the purpose of the present discussion it is sufficient to note that after an access exchange 3 receives a B-number dialled by a subscriber telephone 1, interexchange signalling takes place over the ISUP interface to establish a telephone circuit for the requested call.

In the example of Figure 1, an Initial Address Message (IAM) requesting allocation and reservation of a circuit is passed from the access exchange 3 to the gateway node 5. This IAM identifies the destination exchange 4, from which the gateway node 5 determines that the next leg of the circuit extends over the IP network 7 to the second gateway node 6. The originating side gateway node 5 formulates an Echo Request message and transmits this over the IP network 7 to the terminating side gateway node 6, which responds by returning an Echo Reply message. On the basis of the time elapsed between transmitting the Echo Request message and receiving the Echo Reply message the originating side gateway node 5 is able to determine the round trip propagation delay for a data packet under the current IP network conditions.

The determined propagation delay is then appended to any accumulated delays already included in the IAM received by the originating side gateway 5 from the access exchange 3 (e.g. the round trip propagation delay between the access exchange 3 and the gateway node 5).

The modified IAM is then sent over the IP network 7 to the terminating side gateway node 6 where the (static) round trip propagation delay for the link between that gateway node 6 and the terminating side exchange 4 is further appended to the IAM contained delay. The IAM can then be passed to the terminating exchange 4. Following the establishment of the complete telephone circuit, an Address Complete Message (ACM) is returned from the terminating exchange 4 to the originating exchange 3, the message containing the total accumulated propagation delay.

A decision on whether to introduce an incoming or outgoing echo cancellation device into the telephone circuit may be made at the originating exchange 3 on the basis of accumulated propagation delay returned in the ACM. Alternatively, an echo cancellation device may be introduced at the terminating side access exchange 4.

Figure 2 illustrates further the steps involved in calculating the round trip propagation delay at the originating side gateway node 5.

It will be appreciated by the person of skill in the art that modifications may be made to the above described embodiment without departing from the scope of the present invention. For example, whilst the above description has been concerned with the use of an IP network, the invention is applicable to any suitable packet switched network.

Claims

1. A method of determining the propagation delay over a router controlled IP network intended to provide a segment of a telephone circuit for carrying information between at least two subscriber terminals, the method comprising:

reacting to a request for a telephone circuit between said two subscribers by transmitting a voice packet containing an echo request message over the router controlled IP network from a first network node to a second network node;

reacting to receipt of the echo request message at the second network node by transmitting a voice packet containing an echo reply message over the router controlled IP network from the second network node to the first network node; and

and determining the round trip propagation delay for the router controlled IP network segment on the basis of the time which elapses between sending the echo request message from the first node and receiving the echo reply message also at the first node.

2. A method according to claim 1 and comprising determining the propagation delay for the router controlled IP network segment prior to the sending of an Initial Address Message (IAM) over the router controlled IP network segment.

3. A method according to claim 2 and comprising appending or adding the determined round trip delay to delays determined for preceding circuit segments and defined in the IAM, for transmission over the router controlled IP network.

4. Apparatus for determining the propagation delay over a router controlled IP network intended to provide a segment of a telephone circuit for carrying information between at least two subscriber terminals, the apparatus comprising:

a first router controlled IP network node coupled between a first subscriber and the router controlled IP network and arranged to react to a request for a telephone circuit between said two subscribers by transmitting a voice packet containing an echo request message over the router controlled IP network to a second router controlled IP network node;

the second node being arranged to react to receipt of the echo request message by transmitting a voice packet containing an echo reply message over the router controlled IP network to the first network node; and

processing means associated with the first network node arranged to determine the round trip propagation delay for the router controlled IP network segment on the basis of the time which elapses between sending the echo request message from the first node and receiving the echo reply message also at the first node.

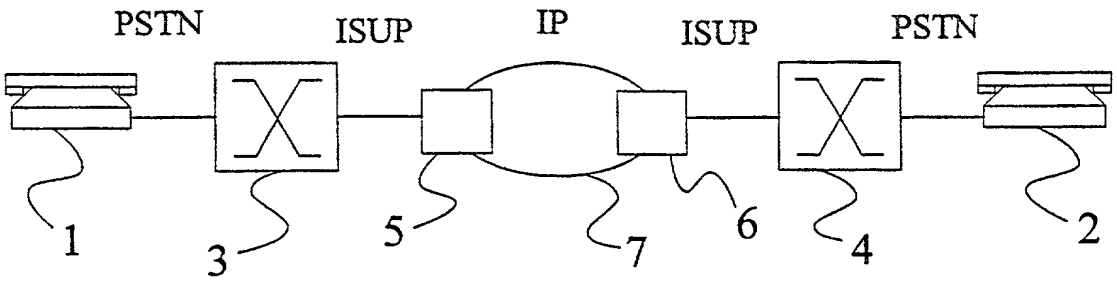

Figure 1

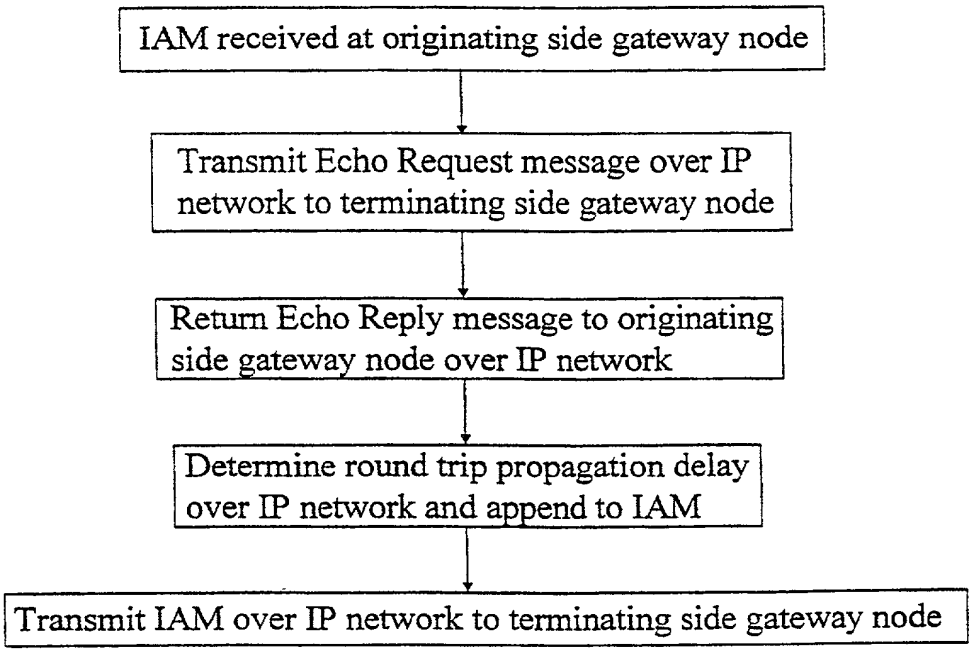

Figure 2

LMF 98119
8K 18 PC-US

COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY **(Includes Reference to Provisional and PCT International Applications)**	Attorney's Docket No. 027566-027

As a below named inventor, I hereby declare that:
My residence, post office address and citizenship are as stated below next to my name;
I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

DETERMINATION OF THE PROPAGATION DELAY IN A PACKET SWITCHED NETWORK

the specification of which (check only one item below):

☐ is attached hereto.

☐ was filed as United States application
Number _____
on _____
and was amended
on _____ (if applicable).

☒ was filed as PCT international application
Number PCT/EP99/08067
on 26 October 1999
and was amended
on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, §1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 (a)-(e) of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed:

PRIOR FOREIGN/PCT APPLICATION(S) AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. §119:

COUNTRY (if PCT, indicate "PCT")	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER 35 U.S.C. §119
Finland	982335	27 October 1998	X Yes _ No
			_ Yes _ No
			_ Yes _ No
			_ Yes _ No
			_ Yes _ No

I hereby claim the benefit under Title 35, United States Code § 119(e) of any United States provisional application(s) listed below.

_____ (Application Number) _____ (Filing Date)

_____ (Application Number) _____ (Filing Date)

COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY (CONT'D) (Includes Reference to Provisional and PCT International Applications)	Attorney's Docket No. 027566-027

I hereby claim the benefit under Title 35, United States Code, §120 of any United States applications(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose to the Office all information known to me to be material to the patentability as defined in Title 37, Code of Federal Regulations §1.56, which became available between the filing date of the prior application(s) and the national or PCT international filing date of this application:

PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S. FOR BENEFIT UNDER 35 U.S.C. §120:

U.S. APPLICATIONS		STATUS *(check one)*		
U.S. APPLICATION NUMBER	U.S. FILING DATE	PATENTED	PENDING	ABANDONED

PCT APPLICATIONS DESIGNATING THE U.S.					
PCT APPLICATION NO.	PCT FILING DATE	U.S. APPLICATION NUMBERS ASSIGNED (if any)			

I hereby appoint the following attorneys and agent(s) to prosecute said application and to transact all business in the Patent and Trademark Office connected therewith and to file, prosecute and to transact all business in connection with international applications directed to said invention:

William L. Mathis	17,337	Eric H. Weisblatt	30,505	Bruce T. Wieder	33,815
Robert S. Swecker	19,885	James W. Peterson	26,057	Todd R. Walters	34,040
Platon N. Mandros	22,124	Teresa Stanek Rea	30,427	Ronni S. Jillions	31,979
Benton S. Duffett, Jr.	22,030	Robert E. Krebs	25,885	Harold R. Brown III	36,341
Norman H. Stepno	22,716	William C. Rowland	30,888	Allen R. Baum	36,086
Ronald L. Grudziecki	24,970	T. Gene Dillahunty	25,423	Steven M. duBois	35,023
Frederick G. Michaud, Jr.	26,003	Patrick C. Keane	32,858	Brian P. O'Shaughnessy	32,747
Alan E. Kopecki	25,813	B. Jefferson Boggs, Jr.	32,344	Kenneth B. Leffler	36,075
Regis E. Slutter	26,999	William H. Benz	25,952	Fred W. Hathaway	32,236
Samuel C. Miller, III	27,360	Peter K. Skiff	31,917	Wendi L. Weinstein	34,456
Robert G. Mukai	28,531	Richard J. McGrath	29,195	Mary Ann Dillahunty	34,576
George A. Hovanec, Jr.	28,223	Matthew L. Schneider	32,814		
James A. LaBarre	28,632	Michael G. Savage	32,596		
E. Joseph Gess	28,510	Gerald F. Swiss	30,113		
R. Danny Huntington	27,903	Charles F. Wieland III	33,096		

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY (CONT'D) (Includes Reference to Provisional and PCT International Applications)	Attorney's Docket No. 027566-027

FULL NAME OF SOLE OR FIRST INVENTOR Leslie GRAF	SIGNATURE	DATE 24/8/01
RESIDENCE Balwyn VIC 3103, AUSTRALIA	CITIZENSHIP ~~Swedish~~ Australian	
POST OFFICE ADDRESS 3 Hender Court, Balwyn VIC 3103, AUSTRALIA		
FULL NAME OF SECOND JOINT INVENTOR, IF ANY Christian GROVES	SIGNATURE	DATE 23/8/01
RESIDENCE Keilor VIC 3036, AUSTRALIA	CITIZENSHIP Australian	
POST OFFICE ADDRESS 53 MARGARET ST, NEWPORT 3015 ~~21 Garden Avenue, Keilor~~ VIC ~~3036;~~ AUSTRALIA		
FULL NAME OF THIRD JOINT INVENTOR, IF ANY Ian RYTINA	SIGNATURE	DATE 23/08/01
RESIDENCE ~~[illegible]~~ Carlton VIC 3053, AUSTRALIA	CITIZENSHIP ~~Australian~~ U.K.	
POST OFFICE ADDRESS 62 CARLTON ST ~~28/25 Barkly Street~~, Carlton VIC 3053, AUSTRALIA		
FULL NAME OF FOURTH JOINT INVENTOR, IF ANY	SIGNATURE	DATE
RESIDENCE	CITIZENSHIP	
POST OFFICE ADDRESS		
FULL NAME OF FIFTH JOINT INVENTOR, IF ANY	SIGNATURE	DATE
RESIDENCE	CITIZENSHIP	
POST OFFICE ADDRESS		
FULL NAME OF SIXTH JOINT INVENTOR, IF ANY	SIGNATURE	DATE
RESIDENCE	CITIZENSHIP	
POST OFFICE ADDRESS		
FULL NAME OF SEVENTH JOINT INVENTOR, IF ANY	SIGNATURE	DATE
RESIDENCE	CITIZENSHIP	
POST OFFICE ADDRESS		
FULL NAME OF EIGHTH JOINT INVENTOR, IF ANY	SIGNATURE	DATE
RESIDENCE	CITIZENSHIP	
POST OFFICE ADDRESS		